

Before the
Federal Communications Commission
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of)
)
Revision of the Commission's Rules)
to Ensure Compatibility with)
Enhanced 911 Emergency Calling Systems)

CC Docket No. 94-102
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COMMENTS OF KSI INC. AND MULOC INC.

KSI Inc. and MULOC Inc., the developer and owner respectively of location-determination intellectual property (collectively "KSI"), pursuant to Section 1.415(d) of the Commission's Rules, hereby submit these Comments in response to the Further Notice of Proposed Rulemaking, FCC 96-264 (July 26, 1996), in the above-captioned proceeding ("FNPRM").

The Report and Order released concomitantly with the FNPRM sets forth important improvements in the quality and reliability of 911 services available to customers of wireless telecommunications service providers. KSI applauds the Commission's efforts to establish a specific timetable for specific objectives that will optimize the delivery and processing of 911 calls and thereby enhance public safety. While the Report and Order generally adopts the proposals supported by the February 13, 1996, ex parte presentation by the Cellular Telecommunications Industry Association, the National Emergency Number Association, the Association of Public Safety Communications Officials, and the National Association of State Nine One One Administrators (the "Consensus Agreement"), the FNPRM recognizes that additional means of ensuring that improvements made possible by technological advances are incorporated into E911 systems can be developed. KSI strongly concurs. In fact, KSI has consistently argued that more can be done sooner

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to improve public safety in this area. KSI respectfully suggests that to achieve these goals, the Commission must eschew any procedures that permit carriers to waive out of location requirements.

The FNPRM seeks comment regarding the development of a minimum latency period to ensure that public safety personnel are informed of callers' locations in time to act in the emergencies they confront.¹ In Additional Comments filed in this proceeding concerning the Consensus Agreement, KSI proposed that certain specific requirements be established both for a latency period (time late) in the availability of location information to the appropriate public safety answering service ("PSAP") operator and for the continuous updating of location information.² KSI notes that the October 1994 Joint Expert Meeting ("JEM"), upon which the Consensus Agreement drew heavily, concluded that location information be available to the PSAP operator no later than five seconds from the time the call is received.³ KSI submits that such information must be available in advance of that time so that it can be applied in the routing of the call to the correct PSAP operator. KSI also recommended that continuously updated location information be provided at ten-second intervals to the PSAP while a 911 call is in progress to facilitate the aid of distressed callers in motion, to support interpretation of the voice information from third-party callers in motion while reporting an observed need for assistance, and to enable the ongoing refinement of any location information.⁴ Passive location technology such as KSI's Direction Finding Localization System

¹ FNPRM at ¶ 142.

² Additional Comments of KSI Inc. at 4.

³ "Wireless Support of 9-1-1 and Enhanced 9-1-1 Emergency Services," Report of the Joint Expert Meeting (Nov. 2, 1994) ("JEM Report"), § 9.1.1 at 26.

⁴ This "motion information" requirement was also addressed and recommended in the JEM Report. See id. at 7, 44.

("DFLS") requires no interaction between the infrastructure and the mobile unit to obtain updated locations; such updates are obtained by applying the same processing to the ongoing 911 voice-channel transmissions as is applied for the initial location. KSI has repeatedly demonstrated with actual field trial data in its Comments, Reply Comments, ex parte filings, and Additional Comments that its DFLS technology can determine location at call origination on the digital control channel and can also passively track a caller's location, whether stationary or in motion, through handoffs on successive voice channels. Maximum time latency and location update capability are critical components to providing an E911 service that provides genuine public safety benefits. Without such capabilities, E911 service will be severely limited, and wireless users will have a false sense of security regarding their safety.

KSI also strongly recommends that the Commission not encourage, by its actions or requirements, the use of waivers that permit carriers to avoid providing any E911 services in rural areas. Rural areas are probably more in need of E911 services than urban areas because assistance in emergency situations is generally less available. In the Report and Order, the Commission acknowledges that the Consensus Agreement suggests that some rural or thinly-populated areas may have system configurations which would not be able to deliver ALI accuracy comparable to that which is required by the Report and Order.⁵ In those "exceptional circumstances" where the ALI accuracy requirements set forth in the Report and Order are not technically or economically feasible, the Commission should require a carrier seeking a waiver from the 125-meter rule to demonstrate the level of accuracy that its infrastructure can achieve.

⁵ Report and Order at ¶ 84.

KSI had proposed a simple differential standard based on a radius of less than 125 meters in urban areas and a radius of less than 1000 meters in rural environments, but the Commission chose not to adopt this approach because KSI did not offer a specific definition distinguishing between urban and rural.⁶ KSI submits that urban and rural areas could be defined by numerically quantifying them in terms of population, density, traffic volume, land use, or any other satisfactory parameter. For example, the Intermodal Surface Transportation Efficiency Act of 1991 ("ISTEA") defines an urban area specifically,⁷ and the Federal Highway Administration defines rural areas as those areas outside the boundaries of urbanized areas as defined by ISTEA. Alternatively, the localization accuracy requirement in a locale or region could be specified as the larger of either 125 meters or 2.5 percent of the characteristic nearest-neighbor antenna-site spacing. The 2.5 percent factor is derived by dividing 125 meters by three miles, which represents a generous spacing assumption for antennas located in urban areas. Thus, if a carrier sought a waiver of the 125-meter rule because its antenna infrastructure was spaced at approximately 20 miles, it should be able, and therefore required, to provide location accuracy within a radius of less than 850 meters.

The Commission also seeks comment regarding its proposal to adopt a standard of 90 percent accuracy, within a radius of 40 feet, at the end of the initial five-year period, and references KSI's

⁶ Id. at ¶ 72.

⁷ P.L. No. 102-240 (1991), codified at 23 U.S.C. § 101. An urban area is defined as an urbanized area or, in the case of an urbanized area encompassing more than one state, that part of the urbanized area in each such state, or an urban place as designated by the Bureau of Census having a population of 5,000 or more and not within any urbanized area, within boundaries to be fixed by responsible state and local officials in cooperation with each other, subject to approval by the Secretary [of Transportation]. Such boundaries shall, as a minimum, encompass the entire urban place designated by the Bureau of Census.

currently available technology that attains a 90 percent accuracy level.⁸ In its DFLS data submitted to the Commission, KSI demonstrated that location with an area of uncertainty (“AOU”) characterized by a probability of containment of 90 percent is identifiable and obtainable, and is said to be subjectively preferred by a responding PSAP operator as opposed to a 67 percent AOU that is smaller. KSI did not and does not aver that implementing its system, or any other system, can economically provide locational accuracy to within a radius of 40 feet, 90 percent of the time, in all environments. Where uniform accuracy requirements exist, it is possible that the implementation of a particular localization system can satisfy such accuracy requirements in all environments, but that the per subscriber cost in certain areas may be prohibitive due to the need for a denser (per subscriber) dispersion of the infrastructure and other enhancements. Simpler, lower-cost, rural solutions, such as KSI's single-site Enhanced Direction Finding System (“EDFS”) approach, offers a viable alternative for adequate safety in these areas, even though accuracy at the 90 percent, or 67 percent, confidence level may be diminished to mitigate the cost per subscriber.

Furthermore, the Commission's proposal regarding three-dimensional, 40-foot accuracy will not be economically feasible in many operational environments.⁹ KSI agrees that in the future, the reduction of cell-site size (diameter) and the establishment of in-building cells, of PBXs that provide extension location information, and of other developing base-station technology (such as that under development by GTE and others) are likely to lead to further improvements in localization area accuracy and confidence such as those set forth in the FNPRM. Thus, if cell spacings are further

⁸ FNPRM at ¶ 139.

⁹ FNPRM at ¶ 138.

reduced to less than a mile, as contemplated for PCS, and if in-building wireless 911 calls are received with proximate, in-building stations/repeaters of known, fixed location, then E911 could more likely be supported by the provision of increased locational accuracy at the 90 percent confidence level. Until then, KSI recommends that altitude continue to be omitted as a requirement and that locational accuracy to better than 100 meters at the 90 percent confidence level not be required.

In addition to economic and operational difficulties, KSI is concerned about the chilling effect that a proposal to adopt a “standard of 90 percent accuracy, within a radius of 40 feet, at the end of the initial five-year period” will have on the adoption of the currently mandated 125 meter, 67 percent accuracy requirement. Carriers may decide to do nothing unless and until they know for certain what standard/requirement they must meet and by when. An additional drawback to such a proposal may arise from those, such as PCIA as evidenced in its request for extension of time to file comments, who incorrectly assume that the Commission and the location industry are declaring that a mobile unit-based approach, such as GPS, is presumed to be the location technology of choice to deliver 40-foot accuracy in longitude, latitude and altitude. In fact, GPS can only perform at this level in unobstructed, desert, airborne, or open-sea environments.

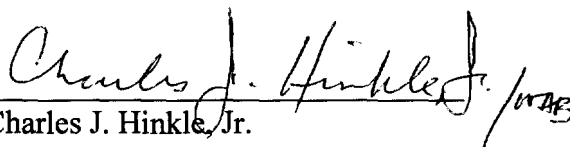
The fact is that the necessary, simultaneous, multiple-satellite reception for successful GPS operation is precluded by obstructions such as buildings, car roofs, trees with foliage, and people. Linking GPS receivers to external roof-mounted or trunk-mounted antennas often works well for automobiles or trucks on the open road. However, the use of GPS outside of vehicles is impaired by antenna shortcomings and battery limitations in addition to nearby obstructions. Currently available and soon-to-be available wireless communications devices (e.g., cellular, PCS, and SMR),

will require extensive retrofitting, and, except under certain favorable situations, GPS does not and will not work for a major number of wireless 911 calls.

The best wireless location system for the full population is an infrastructure-based system such as DFLS. The infrastructure-based approach of DFLS ensures complete, broad, uniform, coast-to-coast protection for all wireless users at the lowest average cost. The Commission should establish standards and requirements based on what is obtainable and affordable. From a performance standpoint, a localization system with interfaces to augment an infrastructure solution with other data derived from systems such as GPS and from map-matching or dead-reckoning systems whenever available, and with an infrastructure with very small antenna-site spacings, could be implemented, but it would be costly. Even though it would be a very robust system, it would not work under all conditions and would still require the previously mentioned indoor enhancements to approach three-dimensional, 40-foot accuracy. Such a mandated standard may result in more harm than good since it is not economically achievable in the marketplace, leading to divisiveness in the regulatory arena.

For the reasons set forth above, KSI respectfully requests the Commission to consider and adopt the Comments set forth above.

**Respectfully submitted,
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